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Education Sector When Applying Digital Technology

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Abstract. Teaching and learning can be improved through digital technology by being more proactive in interacting with students, making students feel more interested and promoting a more engaging learning environment. It can be seen that IT applications provide students and teachers with new ways to communicate more easily and quickly. Multimedia education has made it easier to find and absorb knowledge, contributing to motivating students to improve their self-study ability. Furthermore, a dialogue can be opened based on digital technology between different countries and different cultures, from which purposeful intercultural communication is promoted. It also brings new learning opportunities for students and enriches the educational space. The application of digital technology helps schools more easily communicate information related to student learning to parents as well as optimize the learning process. The study is based on the analysis of relevant research documents to identify a number of factors that need to be considered in the process of digital transformation in education.

Keywords: Application of digital technology, education, digital transformation.

1. Introduction

In the future, automation, innovative technology and artificial intelligence (AI) will dominate our society, which is why the workforce of society needs to recruit a generation of technology- savvy citizens. According to UNESCO (2021), equipping future generations with access to digital platforms, the ability to quickly adapt to technological developments, and deal with large amounts of new information and knowledge continuously is the main goal of education in the future, along with promoting cognitive abilities, successful collaboration skills, critical thinking, and creativity in the digital context. The importance emphasized by UNESCO is that schools and governments have an e-strategy that provides guidance on how to deploy technology systems, electronics, pedagogy and e-learning design, conditions for success through evidence and performance assessment against criteria.

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The literature review comes from research related to the topic to find applications of digital technology in education to improve the quality of educational training in Vietnam in the 2nd century.

2. Method

The paper reviews scholarly peer-reviewed journal articles published from 2016 to 2022. Of the included studies, most were empirical studies (50) investigating the use of digital technologies or data-driven approaches in education.

Two search strings were included for each focus area of the research question (teacher support, improvement systems, learning outcomes), one addressing data-driven decision making, the other using digital technology.

3. Improve and Enhance Learning and Teaching

To enable students to find their own knowledge and inspire students to practice education, digital technology has been applied to provide a learning environment that motivates students. Motivating and connecting students with each other is not limited to the most engaging way for their learning. This topic has been previously studied by many authors and the results show that motivation is created to help students learn actively when there is a connection between students and electronic technology (Fokides & Kefallinou, 2020; Heindl & Nader, 2018). This involves opening up classrooms to engage in connected learning and discovery beyond the boundaries of the school and incorporating technology into the curriculum to facilitate content delivery, diversity and flexibility. Technology can also promote inclusion, equity, and social responsibility by providing learning environments that inspire and prepare students to engage in social technology. Empirical articles include evidence of the value of electronic technology primarily through teachers' perceptions and experiences of working with these technologies.

3.1. Collaboration and communication

Between teachers and students in communication and collaboration are promoted through digital learning activities as reported by some studies. This provides students with more opportunities to share and exchange their creative ideas and is meaningful when compared to non- digital learning activities. Electronic communication tools are integrated into classrooms such as MSTeams, Zalo, GoogleMeet, ... And technology-supported forums or scientific conferences in core learning areas and digital literacy across multiple subjects, promoting 21st century skills and raising awareness of digital citizenship and culture. The same research theme was presented by the authors that students have become more democratic citizens. They found that open and creative perspectives and opinions through online forums are promoted to improve students' literacy skills.

A study by Carreon (2018) examined Facebook applications as an online teaching tool to supplement traditional classroom activities. This study examined how the use of Facebook to create online discussion forums affected 7th grade students in the Philippines. The findings confirmed that the academic performance of those students improved significantly when they participated in closed Facebook groups, while the opposite was true for students who did not participate. The results also showed that academic performance was enhanced through the

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Facebook application by allowing students to participate in their own pace, location, and time of learning, similar to learning management systems that integrate discussion forums already in place. The study found that these activities provided learners with enhanced communication, collaboration, and autonomy, while also boosting students' motivation and confidence in the interaction (Carreon, 2018).

Digital collaboration and communication tools can create interdisciplinary educational contexts that set the stage for blended learning that improves digital literacy, 21st century skills, and connected learning outcomes (Ciampa, 2017; Niemi et al., 2018; Taylor et al., 2020). However, applying such collaboration and communication tools directly to educational contexts requires careful consideration.

3.2. Digital storytelling

Eubanks et al. (2018) studied the impact of integrating digital storytelling into writing workshops. Second-year Chinese language students were selected as the study subjects at a college who participated in daily writing lessons. Students' story writing process varied between students outlining their story before writing through the use of digital applications via iPads and performing the process using traditional methods such as paper and coloured pencils. Digital capabilities included voice and video recording, inserting illustrations and images, handwritten or typed text, and using a book specific to the author and their publication for that story. The goal of this study was to determine whether the use of digital storytelling influenced students' attitudes and abilities in story writing. The results of this study showed that students improved their Chinese writing skills, and that student engagement and motivation were impacted by this.

However, the pedagogical skills and cultural differences that needed to be addressed were also identified by teachers as various challenges, the ability to use shared platforms was impacted by contrasting security restrictions, and incompatible technologies to truly impact potential projects. Oakley et al (2018) asserted that online cultural exchange needs to be further explored, as students will need linguistic, cultural, and digital skills to interact effectively with our increasingly globalized world.

Furthermore, Oakley and colleagues (2018) confirmed the potential of DST in developing core language skills alongside digital literacy. Furthermore, when DST incorporates expanded digital technologies and communications, it can create more learning opportunities for students. And as a result, and inspire creative intercultural communication and learning.

3.3. Gamification

Although the integration of instructional activities into educational games has been around for decades, it is now recognised that students have improved their learning through digital games, enhancing recognition, identification, perceived learning and motivation (Dominguez et al., 2013; Hamari et al., 2014).

A study by Soboleva (2019) investigated the use of mobile gaming applications to support 'questing', whereby students use interactive mobile applications to independently find educational content to solve problems. This provides a very different approach to completing tasks and finding answers compared to traditional methods (Soboleva, 2019). Furthermore, these studies show that students are engaged in the tasks enthusiastically and also improve

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their skills in using digital technology and cognitive activities due to high feedback and interaction when students complete the tasks (Soboleva, 2019).

In addition, a study on the use of e-books by Hediansah & Surjono (2019), showed a small smartphone-based Android application used by students in Indonesia. This study found that students seemed to accept or approve of the custom-built interactive multimedia games developed by their teachers using Adobe Animate to solve physics problems. This study shows that students who completed the test using Android Physics Game had a higher level of knowledge acquired than students who learned the same concepts using traditional methods...These results illustrate the potential of gamification (Domínguez et al., 2013) with game-based activities rich in interactive media to lead to improved student learning and increased student motivation.

Hediansah and Surjono (2019) concluded that digital games provide opportunities for independent and interactive learning, leading to high student enthusiasm and higher learning outcomes.

3.4. Augmented/Virtual reality (AR/VR)

It is possible to create a digital or fully virtual world for students through the use of immersive simulations in augmented reality or virtual reality (AR/VR) of digital technology. To enhance the ability to project discrete objects in 2D or 3D space or provide access to various virtual situations in the computer-generated classroom to create a variety of experiences. As the digital world becomes more realistic and technology advances, AR content scenarios can be projected, virtual reality experiences have become more immersive and realistically overlaid on the student on the next page.

According to Fransson et al. (2020), it will take some time in their implementation of educational virtual reality. It is found that students may focus more on the VR experience than on the subject matter in some cases, but this challenge is also considered the responsibility of teachers to develop the knowledge expertise to guide student learning. The impact of VR on classroom management and organization was considered a challenge by the teachers participating in this study, and none of the teachers believed that VR could be used in whole-class lessons. Furthermore, teachers preferred a well-integrated approach, where VR is a dedicated part of the curriculum or learning process and course content, through linking technology to content, goals and objectives in a holistic approach.

Madanipour and Cohrssen (2020) conducted a review of the contribution of AR to teaching practices and learning outcomes in grade 5 kindergartens. They generated eight articles that matched their search criteria. They concluded that the use of AR can benefit children's academic achievement in the reported areas of speech, alphabet learning and art. AR was found to support children's engagement, persistence, concentration and creativity. Furthermore, they found that AR increased motivation, excitement, and enjoyment as well as social interaction and engagement.

4. Support Teachers and School System Activities

Open spaces are evolving flexible and transparent workplaces designed to support collaborative decision making, collaboration, engagement, knowledge sharing and creativity. The latest news is about the update as the modern vision of learning and teaching in the 21st

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century from Work and Learn impacts how we assess and design learning and how we think about digital technology in the classroom.

School leaders will play a key role in meeting the professional development needs of teachers and supporting each other in developing essential digital competencies and skills. Many different technologies are being used, but large-scale systemic change will require the full investment in teacher advocacy and training indicated by the literature reviewed in this report.

4.1. EPortfolios

Teachers and administrators in the modern school workplace must be provided with systems or technologies that optimize workflows and inform student learning progress. An example of ePortfolio workplace improvement education is the integration of digital portfolios (also known as 'ePortfolios') into teaching and school activities defined as the outcome of which ePortfolios are most successful in creating project-based learning opportunities, enhancing student reflection and enhancing communication between staff and parents; digital collections of artifacts reflect student achievement, documenting student learning. Furthermore, opportunities for related service professionals to assess student development are increased in the use of digital ePortfolios in specific areas.

Clancy and Gardner's (2017) case study, which explored ePortfolio practice, demonstrates the potential of digital technology to optimize the educational workplace. By linking systems to improve communication, reporting learning progress, and interacting with a variety of stakeholders (e.g., field professionals, special needs educators, and parents), ePortfolios support learning and teaching delivery. 'ePortfolios' can more accurately and fully assess student development in both community content areas and in the classroom, provide students with more opportunities to engage in curriculum instruction, provide institutions and parents with a view of students' current proficiency, and provide the structural benefits of incorporating multimedia work into student portfolios (Clancy & Gardner, 2017, p. 99).

4.2. Professional development

The studies in this review show that the use of digital technologies in learning and teaching has benefits that are agreed by teachers (Fokides & Kefallinou, 2020; Fransson et al., 2020). Or Al-Hezam (2017, p. 51) reports that the benefits of digital technologies include the attractiveness of the tools and the ease of communicating information to students as determined by teachers. However, the success of using digital technologies and integrating them in education depends on teachers' understanding and quality leadership.

To impart and build digital literacy, teachers can contribute through collaborative participation in the development of digital resources and strategies. Participation in this process helps teachers maintain teacher autonomy, take ownership, and be well equipped (Clancy & Gardner, 2017). Murray et al. (2019, p. 58) assert the need to "establish a shared vision and plan for integrating technology, [as well as] change attitudes and beliefs, strive for improved professional development, and review assessments".

Fransson et al. (2020) Financial or economic resources are the main challenges for comprehensive development, managing teaching and learning, changing classroom organization, overcoming initial learning barriers, competent teachers, belief in the possession

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of skills and the collision between content and learning outcomes. As Fransson et al. (2020) concluded, there is a lack of technology support, time and encouragement, understanding how to integrate technology into pedagogical practice. The main obstacle to successful use of technology in the classroom is accessibility (availability and classroom management). For digital technology to be effective, it is clear that there is a need for ongoing investment and attention to teacher support and professional development.

4.3. Data-driven decision making

The growth and trends in the field of data-driven decision making are largely driven by the drive to use digital data to make informed decisions about teaching and learning. For example, data-driven learning and analytics involve learners interacting with content, organizations, and other learners to make decisions and evaluate instructional activities, personalize content, and interventions necessary for learner success (Dawson & Siemens, 2014).

Traditional methods of tracking progress and assessing the learning of all learners, especially Indigenous and underserved populations, in critical thinking and skills acquisition are inadequate to meet this challenge. Electronic data enables the development of learner profiles to shape and measure student learning outcomes and provide adaptive and personalized feedback and instruction.

Another paper, Buzhardt et al. (2020), explored how data-driven decisions can support educators in providing and identifying personalized instruction for early learners who need additional language and literacy support. The results showed that progress tracking data systems allow for early detection of underperforming children, thus supporting teachers and parents to respond appropriately by implementing personalized strategies to promote language development (Buzhardt et al., 2020). Recent technological advances have led to the emergence of new wearable real-time analytics tools that support teachers in making data-driven decisions (De Laat et al., 2020).

5. Conclusion

The complex education ecosystem of parents, students, parents, school systems and teachers is closely linked. Positive learning outcomes are brought about by e-learning, motivating and inspiring students as learners in the digital world beyond the confines of the classroom. In terms of skills development along with the use of digital technology in the 21st century, the development of ICT. The creation of connected and communicative online and offline learning spaces, supported by technology and digital tools, can support learning innovation, engage and motivate students. At the same time, it enables students to develop important skills to be ready for the jobs of the future.

In a recent OECD (2021) report published, other digital strategies explored in OECD countries highlight the importance of government policies and technology development to improve teaching, learning and the skills of the education workforce. This literature review identifies that teachers' digital literacy skills and competencies can be developed through appropriate teacher-centred training. Key elements to the successful integration of digital technologies into education are teacher engagement, support and professional development. Innovative professional development may be required to address the technology needs of individual and collective teachers. There is also an acknowledgement of student data and how it can be used to inform system-wide decision- making. However, this decision-making needs

to be collaborative and contextual. The findings from this study highlight the need for school leadership to be distributed across the school and in a variety of roles.

Principals and teachers may need to enhance their data analytics skills to assist them in developing approaches and strategies (in collaboration with other stakeholders) to meet student needs, emerging student needs (or make predictions about future student needs) from information gleaned from broader educational data. There is also an acknowledgement of student data and how it can be used to inform system-wide decision-making. However, this decision-making needs to be collaborative and contextual. The need for school leadership to be distributed across the school and in a variety of roles is highlighted by the findings from this study.

Today, data-driven decision making in schools relies heavily on data from standardized surveys and classroom observations, but the use of integrated digital platforms and systems to provide a steady stream of data is growing. Overall, more research is needed to explore digital technologies in a variety of contexts across the school week, school year, or across student years within subject areas rather than individual curriculum content.

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